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ABSTRACT

The benefits of faculty consulting to the consultant, to the organization receiving the consulting, and to the university are discussed in this speech. The first benefit is that consulting supplements faculty income. It is argued that this enables a university to retain people they might not otherwise be able to afford. It is also pointed out that outside consulting enables a faculty member to stay current with developments in his field, help spread the latest research findings to the newest technological applications (technology transfer), and assist in getting the latest research incorporated into the technology. The advantage to industry of using university-based consultants is described as economically and technologically more efficient, in that rather than maintaining a staff of specialists, the organization can draw on the most outstanding talents in almost every area on an as-needed basis. (SPG)

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FACULTY CONSULTING: BENEFITS TO THE UNIVERSITY

by

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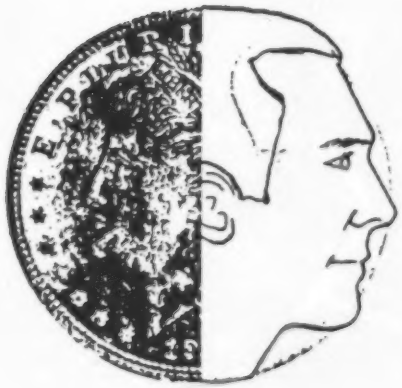

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FACULTY CONSULTING: BENEFITS TO THE UNIVERSITY

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First, I would like to explain how I came to be on the program for this meeting. A few weeks ago, I received an invitation to attend this conference as a member of the audience, and a preliminary list of speakers and topics was included. After studying this material, I called Dr. Linnell to tell him that I though he had done an excellent job of representing the full spectrum of opinion as to why outside income for faculty members is bad. Dr. Linnell suggested that we should get together for lunch about this, and the result was inevitable. I ended up on the program, undertaking to defend what I had previously naively believed to be the self-evident fact that outside consulting by faculty members is not merely tolerable, but in fact highly beneficial, not only to the consultant and to the organization receiving the consulting, but especially to the University itself.

Now that raises the first problem. When I speak of benefits to the University, what view of the University am I taking? Is the University its students, its faculty, its administration, its non-academic employees, its alumni, its donors and funding sources, its trustees, or the community at large which it serves? Fortunately, the benefits which I have identified for my talk today are rather insensitive to these distinctions. They benefit all constituencies of the University, though perhaps some more than others.

I would also like to disclose my own biases and limitations. I am most familiar with the realities of consulting in my own technical specialty of communication systems, and reasonably acquainted with the more general situation regarding electrical engineering and computer science consulting to the aerospace, defense, and electronics industries. My perspective is that of a faculty member with fifteen years of service at the University of Southern California, and while

I have never been a department chairman or dean, I recently completed a year as President of the Faculty Senate. I don't know whether that counts as working with or against the administration. I might also mention that I started my consulting activities while I was still a graduate student at Harvard, nearly ten years before I came to USC, and that I regard my consulting experience as having played a crucial role in my technical and professional career. Indeed, while I was working on my doctoral thesis in pure mathematics at Harvard, I was also working on another document -- Hegel would no doubt have called it my antithesis -- inspired by my early consulting work in the practical applications of discrete mathematics to communications, and eventually published as a book called Shift Register Sequences. My subsequent career has largely consisted of working out the synthesis of these two underlying themes. It is interesting that Harvard did not seem to have any rules restricting consulting by graduate students! Of course, I was a customer rather than an employee, and customers are notoriously difficult to regulate. In those days, it never occurred to me that a mere doctoral student could get research funding through his institution to write his thesis.

Now I am ready to enumerate the specific benefits of faculty consulting to the University. The first and most obvious benefit is that consulting supplements faculty income. I have been amazed to hear the question raised as to why professors in those areas where consulting is available should be allowed to earn more total income than those in areas where consulting is not available. This is a totally naive and unrealistic view of the alternatives facing the University. In those fields where professionally and academically enriching consulting is available, the best people would not come to the University, or being at the university, will not remain, if they are denied both the professional experience, and the income, associated with consulting. Nor is it realistic to assume that the University would or should undertake to make up this loss in income in order to retain good people.

To bring this into perspective, I would like to offer you some numbers which are fairly typical for my department. Our hypothetical Professor Jones has a nine-month academic salary of $22,500. He works two summer months on funded research at the university, for an additional $5,000, which brings his total salary from the university to $27,500. Now it turns out that Jones is one of the leading men in the country in his specialty, and he commands a daily consulting rate of $400. I should mention that my colleagues variously admit to (or boast of) consulting rates as low as $200 and as high as $800 per day, depending on how fashionable their specialty is at the moment, and how highly they are regarded in it. I know first-hand that offers of $600/day are real, and our hypothetical Dr. Jones has no trouble finding consulting work at $400/day. Unlike some of his colleagues, he strictly limits his consulting to one day per calendar week, plus the summer month for which he is off the University payroll, for a total of only seventy consulting days per years, or $28,000. Remember that his total University salary. including summer money, was $27,500. Thus his gross income is at least doubled. Would he have been worth twice as much to the University for that extra one day per week? Certainly not. Note also how easily he could replace his entire University income, simply by consulting two days per week instead of one. He works much harder, per dollar, for the University than for industry. It would be reasonable to say four times as hard. Economically, the present consulting rules make it possible for universities to attract truly outstanding leaders in various professional fields, on a basis which the University can afford, and which the faculty member is willing to tolerate. Eliminate faculty consulting, and either the salaries of such people become prohibitively expensive to the University, or they will be lost to alternative forms of employment which are available to them.

Dr. Linnell has commented to me on several occasions that my department is "atypical," and that therefore the concerns which I express should perhaps be discounted in determining university-wide

policies. I readily agree that my department is atypical. In recent surveys, Electrical Engineering has been one of only two departments at USC (the other is Music) which have been rated "Outstanding." If you propose to adopt rules well-suited to the majority of departments, but to the serious detriment of the best departments, then I submit that what you are advocating is to institutionalize mediocrity.

The economic issue is an obvious one, but there are several others which are equally important. The next three I will mention are (1) technological currency, (2) technology transfer, and (3) research inspiration.

In a field like electrical engineering, if a faculty member spent all his time on the campus and never got out into the real world, he and his courses would become obsolete virtually overnight. The man who joined the faculty thirty years ago would still be teaching about vacuum tube circuits, and even the fifteen-year man would know nothing beyond transisters on lumped-parameter printed circuit boards. Our students would be trained for long-vanished worlds. In my own field of communication systems, the most challenging practical problems are not at any university. They are in industry, and in large government programs. It is not at the University that the latest satellite communication systems are being designed, or the most ambitious data communication networks being configured. If I did not keep in touch with the reality of the most advanced on-going developments, my graduate courses and research papers would soon become some arcane art form, like Chinese Opera, perhaps fascinating on some intellectual level, but totally unrelated to the real world of engineering. It is no accident that the professors who have the most distinguished record of scholarly achievement and publication are the ones most in demand as consultants. They have the opportunity to help spread the latest research findings to the newest technological applications, thus shortening the process of technology transfer by months or years. One of the reasonable concerns of the contract monitors on our re-

search grants to the University is whether any of the research they are funding ever finds its way into practice. The Department of Defense agencies, ARO, ONR, and AFOSR, are particularly concerned about this. Faculty consulting is probably the most efficient mechanism imaginable to get the latest research incorporated into the technology. Also, the consulting experience is the best source of new problems to work on, since it frequently becomes evident what the next advances would have to be in the state of the art which would have significant practical implications. It is these difficult problems which come back from the real world which become the important new research topics.

Incidentally, in my field at least, it is extremely easy to distinguish between the type of grant-funded research done at the university, and what is done as outside consulting. My grant-funded research ends up in journal articles in any of two dozen different periodicals. None of my consulting agreements has ever been for the express purpose of producing a journal article, though in fact several articles have been spawned as byproducts of my consulting, but the consulting client has a practical problem which he wants solved, preferably using the most advanced research techniques.

There has been much talk at this conference of "conflict of interest" problems, and I must confess that I find most of it totally bewildering. I have tried in vain to imagine a consulting relationship in which one of my colleagues might engage which would induce him to teach his math students that two plus two is five, or to tell his engineering students that Ohm's Law is other than $E = IR$. Perhaps there is a danger in the Social Sciences, where all knowledge seems tentative at best, that a consulting relationship might induce a faculty member to substitute one brand of nonsense for another, but that is an area I know very little about. However, in the natural sciences, mathematics, and engineering, where most of the faculty consulting seems to occur, the issue of "conflict of interest" which has been discussed so much here is simply unrelated to anything I have observed.

It has been suggested that all faculty members should publish annually the list of all organizations for which they have consulted, so that when they take positions on matters of public policy their biases can be ascertained. First, I am not aware of a single colleague at USC in engineering or the natural sciences who is in the habit of issuing press releases on controversial matters of public policy! We are discussing elaborate rules, which would be applicable to everyone, to cover a hypothetical case which has not yet occurred. If the biases of those engaging in public policy debates should be disclosed, I would recommend waiting until someone is so engaged before requiring the disclosure. However, even that idea runs counter to my academic instincts. I would rather judge arguments on their intrinsic merits, rather than on the possible motives of their advocates. In fact, there are many areas of public controversy (e.g., the abortion issue) where disclosure of the person's religious affiliation, or (e.g. on certain economic issues) present and past political associations, would be far more relevant in determining biases than mere consulting relationships. I do not believe we should compel such disclosure in any of these situations.

Another question I have heard raised is whether consulting poses some sort of threat to academic values by distorting what a faculty member will work on. In my experience, this is a needless worry. A faculty member is sought out as a consultant based on his reputation in the areas he has already worked in, and the consulting work tends to reinforce his strength in the very subjects he has already chosen for himself! I would sooner worry about the problem of the faculty member trying to get a grant to do sponsored research on campus. Here, the whims and fashions in the various granting agencies, and the very real pressures from within the university to obtain such funding, may induce a faculty member to shift his research from his true area of interest to something more "marketable." I don't lose too much sleep over this one, because the best faculty members rarely encounter this problem, but it is certainly more real than most of the phantasms I have heard conjured up at this conference.

The advantages to industry of using University-based consultants are fairly self-evident. Instead of trying to maintain a complete collection, or zoo, of every type of specialist on the full-time payroll, at great cost and inefficiency, the organization can draw on the most outstanding talents in almost every conceivable area on an as-needed basis. In effect, this is talent which it is more economical to rent than to buy. Those industries which find they benefit by this arrangement are in turn more generously disposed toward the fund-raising efforts of the University. At USC, they become Industrial Assoicates of our School of Engineering, sponsor large graduate fellowship programs, endow professorial chairs, and generally act in a friendly and supportive manner.

I would like to offer as my central thesis in this address that the one-day-a-week approach to faculty consulting provides for a near optimum in the use of the faculty member's time for its greatest social benefit. It enables the faculty member to stay current in his or her field, effect the transfer of research findings into practical reality, provides him or her with the inspiration for further research, helps to build the general professional reputation of the faculty member and the University, and builds good will in the community towards the University. We would be squandering a major national resource if we denied government, industry, and society at large access to those consultants.

At USC, our Dean of Engineering has been heard to observe that any faculty member who is not in demand as a consultant isn't really good enough to be on the faculty. He has also commented that the opportunity to consult in the Los Angeles area has been one of the most important tools in recruiting outstanding engineering faculty, who are attracted not only by the economic rewards, but equally important, by the professional development which this entails.

Dr. Linnell has suggested that perhaps all faculty consulting could be channelled through the University, and offers the analogy of the so-called "private practice clinics" at many medical schools. There are

excellent reasons why no university-run "consulting clinics" have arisen in engineering, and it is not only, or even primarily, that medical faculty receive far higher salaries than engineering faculty. Rather, it involves the nature of the customer, and the services which the customer requires. Ever since doctors stopped making house calls, in what now seems like the dim dark past, patients are resigned to the fact that they must visit the doctor at his location. Moreover, for a diagnostic clinic, the University can provide a battery of special facilities, so that doctor and patient both stand to gain from the interposition of the University into the picture. Engineering is totally different. Engineering consultants do make "house calls." If the technological problem exists at Hughes Aircraft, or TRW, or CDC, or an army base is some remote location, then that is generally the place to go to solve the problem. The patient cannot and will not come to see the doctor; and neither will agree to cut the University in for a share of the pie, because the University is not providing extra facilities or services which benefit the two original parties. In fact, any attempt by the University to provide such services would inevitably result in a monstrous increase in bureaucratic red tape. (Who will own the patent rights? Has all the fine print in the contract been checked? What overhead will be paid to the University? etc.) Most potential customers will be scared off, and look for a consultant elsewhere.

One thing which <u>has</u> grown up around many major research universities, and which is perhaps the true engineering analogue of the "private-practice" medical clinics, is the off-campus research center. Many examples come to mind -- M.I.T.'s Lincoln Labs, Caltech's JPL, Stanford's SRI, John Hopkins' APL. Some, like SRI and Calspan (formerly the Cornell Aeronautical Labs) and M.I.T.'s Instrumentation Lab, have become autonomous or even totally independent of the originating university. But in no case has there been a requirement that all engineering faculty channel their consulting work

through such a construct, and it is reasonably clear that such a decree would kill most meaningful and potentially enriching consulting by faculty members, and result in pressures to "consult" on contracts already booked by the contract research center. At this point, the engineering faculty member would be far better off anywhere in industry, where he would be expected to perform only one basic job, at a higher salary, rather than the combination of teaching, government sponsored grant research, consulting center research, and university service, all at a lower salary.

I have a similar observation regarding the involvement of the University in the ownership and management of the "intellectual property" created by the faculty members. The test of fairness should be to ask whether the institution is merely trying to pluck some feathers from these exotic wild birds it is keeping in captivity, or whether it is actually bringing something to the party. For example, M.I.T. has an associated organization to help find licensees for the patents on inventions by faculty members. In this case, it is certainly fair for the institution and the inventor to share the royalties. On the other hand, if the University merely sits back idly, while the faculty member makes the invention, patents it on his own, and finds the licensee, and <u>then</u> steps in to claim a percentage, I would regard that as outright plunder. (The situation with books and publishers is virtually identical.) Now I have observed that throughout history, the nobler and holier the institution, the greater the atrocities it is able (and even willing) to commit, the ultimate examples being nation states and established churches. University Administrations and State Legislatures may indeed have the power to tyrannize faculty. The question is whether they will have the good sense and restraint <u>not</u> to.

I have an additional observation about consulting. One of today's speakers is of the persuasion that our whole society, our government, our industry, and our entire economic system are all evil, and should be radically altered, whereas faculty consulting tends to reinforce

these iniquitous institutions. If you do not share this dire view, and I do not, but believe that these institutions are fundamentally sound but could stand improvement, then faculty consulting becomes one of the mechanisms by which to effect this improvement.

Some of the participants in this conference genuinely believe that it is immoral or unethical for faculty members to have sources of income other than the University. On this I disagree most vigorously. There is no reason acceptable to me why any employer should own its employees, or control their activities on holidays, evenings and weekends. The duties to the University should be defined in positive terms, rather than negatively in terms of what thou shalt not do for someone else. I believe that consulting, negotiated and conducted directly by the faculty member with the outside consulting source, is an excellent form of exposure to and participation in the American economic system. I am sure that most of the Trustees and Regents of our respective institutions would be enthusiastic to learn that outside consulting for extra income is the ideal way to give faculty members a stake in the American Economic System, and to enable them to be professional in at least one of the meanings of the term, whereby the professional is the one who tells the client how much the services already rendered will cost. That's what doctors and lawyers do, and we all agree on how professional they are! Alternatively, if faculty members are treated as wage slaves, and forbidden to have outside private lives, they will react accordingly. The best faculty members will leave. The others will become sullen, turn to collective bargaining, and make sure they are not doing a bit more than they are being paid for. I am reminded of a comment by an acquaintance at another, less enlightened institution, who explained that he had an unwritten understanding with his employer. "They pay me just enough so I don't quit, and I do just enough work so they don't fire me."

My utopian view of what the University ought to be imagines an original condition in which there were many independent scholars who,

á la Rousseau, entered into a Social Contract and jointly formed the University. In order to take care of the housekeeping chores, they created an administration, which was intended to be a servant, but like many legendary parallels, has become a monster, and tyrannizes its creators, trying to put enough strings on them to make them the puppets. We no longer even bother to ask faculty members what is right or good for faculty, but go directly to the academic administrators!

At least one speaker at this conference has advocated what amounts to an "Academic Commune," wherein the productive and the capable subsidize the indolent and the incompetent financially as well as intellectually, by pooling all income from all sources, and redividing it equally, or even on the basis of "need." This is indeed the pure Marxist formula, "From each according to his ability, to each according to his need," a notion so simplistic and unworkable in practice that Lenin himself abandoned it as early as 1921, when he promulgated his "New Economic Policy."

Let me leave you with one final observation. In society at large, while we recognize that there are criminals, we do not solve the problem by putting everyone in jail; and while we recognize that there are lunatics, we do not propose putting the entire population in straight jackets. Simply because of the possibility of occasional abuses, let us not impose the analogous "solutions" on all faculty members on our campuses.